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Amendments to the Claims

1(Currently amended). A method of implementing ~~the a~~ Viterbi algorithm comprising:

calculating branch metrics for branches of ~~the a~~ Viterbi trellis;

combining the branch metrics with old path metrics to produce candidate path metrics;

selecting a new path metric associated with a selected trellis path for each state in the Viterbi trellis from the candidate path metrics; and

composing an optimal path value for each state in the Viterbi trellis, the optimal path value indicating multiple transitions of the selected trellis path.

2(Currently amended). The method of Claim 1 wherein the optimal path value ~~is comprised of~~ comprises optimal path value fragments.

3(Original). The method of Claim 2 wherein the optimal path value fragments are stored in memory blocks.

4(Original). The method of Claim 1 further comprising using the optimal path value to determine an output value.

5(Currently amended). The method of Claim 4 1 wherein the optimal path value for ~~the a~~ lowest state of the Viterbi trellis at the an end of a memory block of symbols indicates ~~the~~ transmitted symbols in the block.

Cancelled
6(Delete). The method of Claim 4, wherein the optimal path value for state zero indicates the transmitted symbols in a block of symbols.

Cancelled
7(Delete). The method of Claim 1 wherein the new data added to the optimal path indicates a new decoded bit.

Cancelled
8(Delete). The method of Claim wherein the new data is a new data bit.

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9(Currently amended). The method of Claim 1 wherein further including using a traceback pointer is used to select between two prior optimal path values.

10(Currently amended). The method of Claim 9 wherein the further including selecting an old optimal path values are selected from the optimal path values value for states a state that can transition transitions into a current state.

cancel

11(~~Delete~~). The method of Claim 9 wherein the new data is added to the selected optimal path value of the prior state.

12(Currently amended). The method of Claim 1 wherein the Viterbi algorithm is implemented ~~in~~ by a reconfigurable chip.

13(Currently amended). The method of Claim 1 wherein selecting the new path metric selecting and composing the optimal path value composing steps operate in parallel.

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14(Currently amended). An apparatus to implement ~~the a~~ Viterbi algorithm comprising:

a path metric storage adapted to store a path metric associated with a selected trellis path for each state in ~~the a~~ Viterbi trellis;

a path update unit adapted to update each path metric;

an optimal path value storage adapted to store an optimal path value for each state in the Viterbi trellis, the optimal path value indicating multiple transitions of the selected trellis path; and

~~a~~ an optimal path value update unit adapted to update each optimal path value.

15(Currently amended). The apparatus of Claim 14 further comprising an output unit ~~adapted to use an optimal path value to determine an output value for the Viterbi algorithm.~~

16(Currently amended). The apparatus of Claim 15 wherein the output value ~~produces~~ is the optimal path value for the state with ~~the a~~ lowest path metric.

Canceled

17(~~Delete~~). The apparatus of Claim 14 wherein the updating of multiple states, path metrics and optimal path value are done at the same time.

18(Currently amended). The apparatus of Claim 14 wherein the path metric update unit and the optimal path value update ~~operates~~ unit operate in parallel.

19(Currently amended). The apparatus of Claim 14 ~~implemented on~~ wherein the Viterbi algorithm is computed using reconfigurable logic.

20(Currently amended). The apparatus of Claim 19 wherein the optimal path ~~updating value update unit~~ uses resources not required for used by the path metric update unit.

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21(Currently amended). The apparatus of Claim 14 wherein there is no serial traceback operation is required.

22(Currently amended). The apparatus of Claim 14 wherein the optimal path value storage is separated into includes multiple memory blocks.

23(Currently amended). The apparatus of Claim 22 wherein the optimal path value comprises optimal path fragments stored in the multiple memory blocks.

24(Currently amended). The apparatus of Claim 23 wherein the optimal path value ~~updating unit operates on~~ update unit operates on the optimal path value fragments to update the optimal path value.

25(Original). The apparatus of Claim 23 wherein, during the readback operation, the optimal path fragment from one memory block is used to determine a pointer to an optimal path fragment in another memory block.

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AM
Concl

26(New). A method to determine a maximum-likelihood path through a convolutional encoder, comprising:

a parallel implementation to prefetch previous optimal paths of two states from an optimal path memory and fetch traceback path width data bits from a path memory that is appended with data bits to provide an entire optimal path leading up to that path for each state.

27(New). The method of claim 26 further comprising:
sharing address generators for the optimal path memory and the path memory.

28(New). The method of claim 26, further comprising:
receiving a new symbol by the convolutional encoder; and
appending a new bit to the optimal path stored in the optimal path memory for each new symbol received.